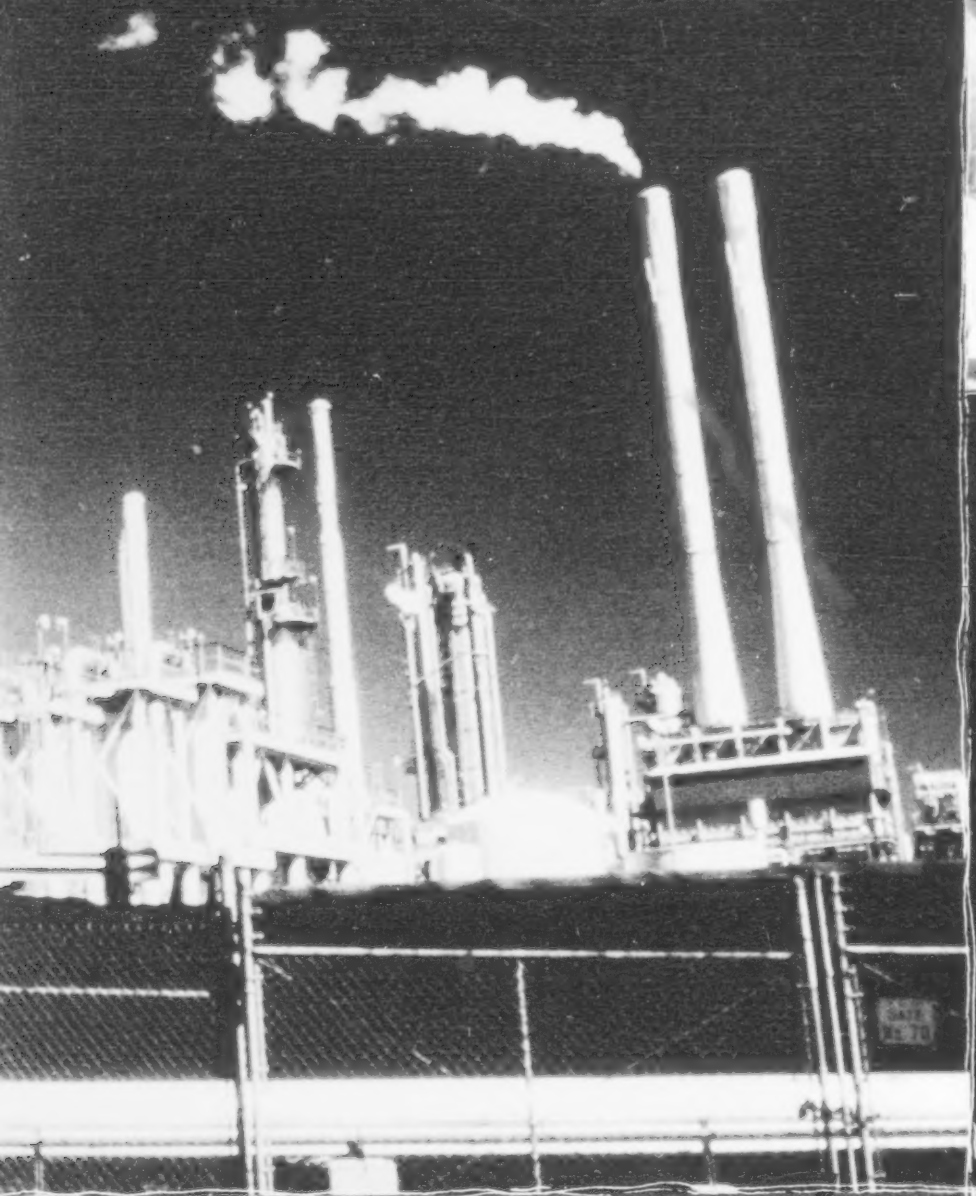
# 2001 National Overview — National Pollutant Release Inventory

*Canadian Environmental Protection Act, 1999*



## Final Disposal and Off-site Transfers for Treatment Prior to Final Disposal

www.ec.gc.ca/npri

November 2003

Canada

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**National Overview —**

National Pollutant Release Inventory

*Canadian Environmental Protection Act, 1999*

# Final Disposal and Off-site Transfers for Treatment Prior to Final Disposal

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# 1 OVERVIEW OF THE NPRI

## 1.1 What Is the NPRI?

The National Pollutant Release Inventory (NPRI) is a legislated, nationwide, publicly accessible inventory of pollutants released to the environment. It was created in 1992 to provide Canadians with information on pollutant releases from facilities located in their communities, including the quantities discharged to air, water, land, and underground injection and the quantities sent to other facilities for disposal, treatment, or recycling and energy recovery. It also supports a number of environmental initiatives, by providing information that:

- helps governments and others to identify priorities for action;
- encourages industry to take proactive measures to reduce releases;
- allows for tracking of progress in reducing releases; and
- supports a number of regulatory initiatives.

The NPRI is a constantly evolving program. Public and stakeholder consultation is an integral part of the changes to the program. Since the NPRI's inception, substances have been added and deleted, the thresholds at which substances are reported have been adjusted, and the NPRI has expanded in scope to collect data on recycling and pollution prevention activities. Further refinements are planned for future years.

The NPRI program is delivered by Environment Canada under the authority of the *Canadian Environmental Protection Act* (CEPA).[1] Owners or operators of facilities that manufacture, process, or otherwise use one or more of the NPRI-listed substances under prescribed conditions are required to submit an annual report to Environment Canada on the releases and transfers of those substances.[2]

For more information, refer to Environment Canada's NPRI Web site at **www.ec.gc.ca/npri/**, or contact your nearest NPRI office.

## 1.2 What's New for the 2001 NPRI?

### *1.2.1 NPRI Substance List for 2001*

The NPRI changed significantly for the 2000 reporting year with the introduction of alternate reporting thresholds. Certain substances are listed at alternate thresholds because they pose serious risks to human health or the environment in relatively low quantities, and very limited data, if any, would be reported to the NPRI for these substances at the original 10-tonne and 1% concentration reporting threshold. Substances with alternate reporting thresholds in the 2001 NPRI include mercury (and its compounds), 17 polycyclic aromatic hydrocarbons (PAHs), dioxins/furans, and hexachlorobenzene (HCB).

The following changes were made to the NPRI substance list for the 2001 reporting year:

- addition of N,N-dimethylformamide (CAS No. 68-12-2) to Schedule 1, Part I, of the 2001 *Canada Gazette* notice;
- amalgamation of the individual isomers of cresol (*m*-, *o*-, and *p*-cresol) under the "cresol (all isomers)" listing;
- changed qualifier for vanadium to "(except when in an alloy) and its compounds" from "fume or dust"; and
- de-listing of phosphoric acid (CAS No. 7664-38-2).

The list of NPRI substances for the 2001 reporting year is provided in a supplementary table found on the NPRI Web site at **www.ec.gc.ca/npri/**

### *1.2.2 2001 National Overview Series*

The 2001 National Pollutant Release Inventory (NPRI) National Overview (referred to as the "2001 National Overview") consists of the following series of documents:

- 2001 National Overview — Reporting Requirements, National Pollutant Release Inventory;
- 2001 National Overview — Summary of 2001 Data, National Pollutant Release Inventory;

1 The 1988 CEPA was in force for previous years of NPRI reporting. CEPA 1999 came into force in April 2000 and is the authority for the 2001 reporting year and beyond.

2 The requirements for the 2001 NPRI were published in the *Canada Gazette*, Part I, on December 29, 2001.

- 2001 National Overview — Releases, National Pollutant Release Inventory;
- 2001 National Overview — Final Disposal and Off-site Transfers for Treatment Prior to Final Disposal, National Pollutant Release Inventory; and
- 2001 National Overview — Recycling and Energy Recovery, National Pollutant Release Inventory.

The 2001 National Overview was categorized in this manner to provide Canadians with more focused and concise summaries regarding the NPRI reporting requirements, on-site releases of pollutants, final disposal of pollutants and off-site transfer of pollutants for treatment prior to final disposal, and information on recycling and energy recovery in Canada for the 2001 reporting year. The 2001 National Overview series includes data as they appeared in the NPRI database on **November 8, 2002**.

In addition to the 2001 National Overview series, Environment Canada has developed a new report entitled *Informing Canadians on Pollution 2003: Highlights of the 2001 National Pollutant Release Inventory (NPRI)*. This report provides a snapshot of pollution from industrial and commercial companies in Canada in 2001. In addition to marking progress on sector and pollutant releases and disposal and recycling trends, other highlights include special sections on toxic substances, pollution prevention, managing pollution in Canada, and tips on how communities and individuals can use the NPRI.

### *1.2.3 New Groupings for Releases and Transfers*

Environment Canada engaged stakeholders during 2002 to review the "reporting in" and "reporting out" of NPRI information. This review was identified as a priority during the consultation process by the NPRI Multistakeholder Work Group on Substances. In previous reporting years, some stakeholders expressed concerns with the reporting of pollutants sent to a landfill on site as a release to the environment, whereas transfers off site of pollutants for final disposal to a landfill were reported as transfers. This difference in classification could lead to a different representation of the same activity, depending on whether it occurred on site or off site. There is also an issue of perception — sending substances to a landfill is perceived differently from releases to air and water.

Stakeholders have recommended that releases include only releases to air and water and those releases that disperse material on land. Substances sent to landfill or land farm or underground injection on site should be grouped together with transfers off site destined for a similar fate. Other options are possible, but the recommended option has a number of advantages, including the following:

- Similar activities are portrayed in a similar manner, whether they occur on site or off-site.
- It will be easier to track trends in disposal.
- It provides a more intuitive presentation of information.

Through this work with stakeholders, a new format was established for summarizing releases and transfers of NPRI pollutants. The following groupings were used to summarize information collected through the NPRI for the 2001 reporting year:

On-site pollutant releases:

- air
- water
- land — includes spills, leaks, and other

Final disposal:

- on-site disposal: landfill, land treatment, and underground injection
- off-site disposal: landfill, land treatment, underground injection, and storage

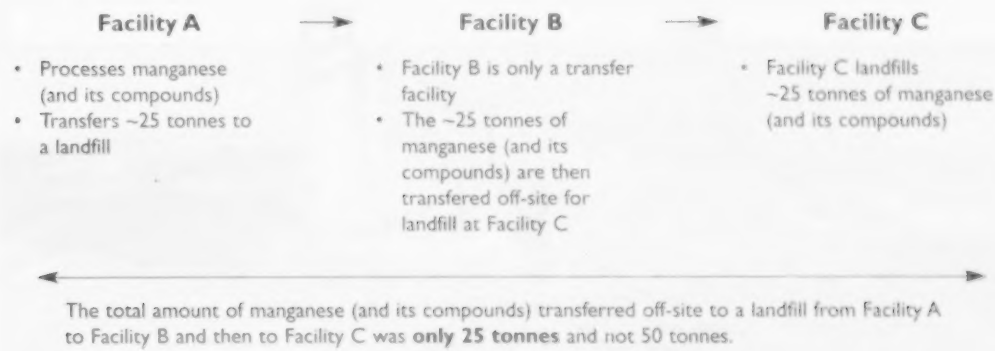
Off-site transfers for treatment prior to final disposal:

- physical treatment
- chemical treatment
- biological treatment
- incineration or thermal treatment where energy is not recovered
- treatment at a municipal sewage treatment plant (MSTP)

Off-site transfers for recycling and energy recovery:

- recycling
- energy recovery

## Figure 1-1 Example of Double Counting


Facility A
Facility B
Facility C
• Processes manganese (and its compounds)
• Transfers ~25 tonnes to a landfill
• Facility B is only a transfer facility
• The ~25 tonnes of manganese (and its compounds) are then transfered off-site for landfill at Facility C
• Facility C landfills ~25 tonnes of manganese (and its compounds)
The total amount of manganese (and its compounds) transferred off-site to a landfill from Facility A to Facility B and then to Facility C was **only 25 tonnes** and not 50 tonnes.

Appendix A provides NPRI definitions for releases and transfers.

Double counting is an issue that needs to be considered when attempting to add releases and transfers together. It is important to understand that there is no double counting of releases and disposal on site, whereas transfers may be counted more than once. In Figure 1-1, for example, Facility A transfers approximately 25 tonnes of manganese (and its compounds) (deemed to be a waste material by Facility A) to Facility B (a transfer facility). Facility B then transfers the same 25 tonnes of manganese (and its compounds) to Facility C, which proceeds to landfill this material. In addition, Facility A, Facility B, and Facility C file reports to NPRI for the 2001 reporting year. In this example, it is important to note that **only 25 tonnes** (and not 50 tonnes) of manganese (and its compounds) in total are transferred off site from Facility A to Facility B and then to Facility C.

# 2 SUMMARY OF ON-SITE AND OFF-SITE FINAL DISPOSAL IN 2001

In 2001, 2618 facilities across Canada reported to the NPRI, of which 839 submitted data on on-site and off-site final disposal totalling an estimated 181 681 tonnes and 38 208 tonnes, respectively (see Table 2-1).

For additional information on the facilities and companies that reported to the NPRI for the 2001 reporting year, refer to the supplementary table found on the NPRI Web site at **www.ec.gc.ca/npri/**

## 2.1 On-site Final Disposal in 2001

Facilities reported an estimated 181 681 tonnes of NPRI-listed pollutants that were sent for on-site final disposal in 2001, a decrease of 11 767 tonnes (or -6.1%) from 2000. The following breakdown summarizes on-site final disposal activities in 2001 (see Figure 2-1):

- landfill: 26 697 tonnes (14.7%), an overall decrease of an estimated 2652 tonnes (or -9.0%) from 2000;
- land treatment: 880 tonnes (0.5%), an overall increase of an estimated 371 tonnes (or +72.8%) from 2000; and
- underground injection: 154 104 tonnes (84.8%), an overall decrease of an estimated 9485 tonnes (or -5.8%) from 2000.

The decrease that was reported from **on-site final disposal — landfill** was mainly attributed to a reduction of an estimated 1525 tonnes (or -15.1%) of calcium fluoride and 1513 tonnes (or -56.1%) of lead (and its compounds) from the Alumina and Aluminum Production and Processing (NAICS No. 3313) and Waste Treatment and Disposal (NAICS No. 5622) industrial sectors, respectively. The decrease that was reported from **on-site final disposal — underground injection** was mainly due to a reduction of 7746 tonnes (or -5.2%) of hydrogen sulphide from the Oil and Gas Extraction (NAICS No. 2111) and Support Activities for Mining and Oil and Gas Extraction (NAICS No. 2131) industrial sectors.

**Table 2-1 National Summary of On-site and Off-site Final Disposal in 2001 [A]**

| | 2000 | 2001 | Change (2000–2001) | % change (2000–2001) |
|---|---|---|---|---|
| Total facilities | 781 | 839 | 58 | 7.4 |
| Total reports | 2 737 | 2 857 | 120 | 4.4 |
| Pollutants reported | 122 | 124 | 2 | 1.6 |
| Final disposal (tonnes): | | | | |
| On-site disposal: | | | | |
| Landfill | 29 349.3 | 26 697.1 | -2 652.2 | -9.0 |
| Land treatment | 509.3 | 879.9 | 370.6 | 72.8 |
| Underground injection | 163 589.3 | 154 104.3 | -9 485.0 | -5.8 |
| **Total** | **193 447.9** | **181 681.3** | **-11 766.7** | **-6.1** |
| Off-site disposal: | | | | |
| Landfill | 29 677.6 | 24 279.7 | -5 397.9 | -18.2 |
| Land treatment | 1 645.4 | 2 472.3 | 826.9 | 50.3 |
| Underground injection | 8 119.2 | 9 078.4 | 959.3 | 11.8 |
| Storage | 2 111.5 | 2 377.7 | 266.1 | 12.6 |
| **Total** | **41 553.6** | **38 208.1** | **-3 345.5** | **-8.1** |

[A] Because of rounding of release and transfer quantities, the totals may not equal the sum of the individual values.

Figure 1-1 Example of Double Counting


Facility A
• Processes manganese (and its compounds)
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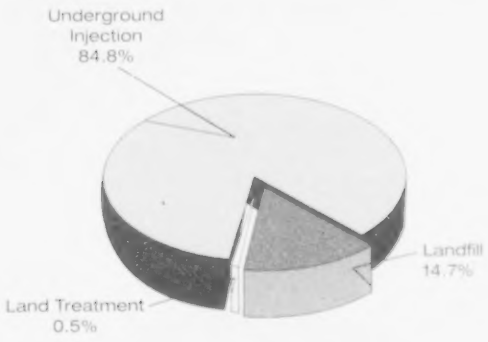
**Figure 2-1 On-site Final Disposal in 2001**




It is important to note that increases and decreases in the final disposal of pollutants can be attributed to numerous factors (these factors should be considered when using NPRI information), including, but not limited to, the following:

- facilities reporting to the NPRI for the first time;
- facilities using improved estimation methodologies;
- changes in facility infrastructure and processes/operations; and
- use of pollution prevention techniques.

### *2.1.1 Twenty-five NPRI Pollutants Sent in Largest Quantities for On-site Final Disposal in 2001*

Table 2-2 highlights the 25 NPRI-listed pollutants sent in the largest quantities for on-site final disposal in 2001, by disposal method. These 25 pollutants accounted for an estimated 181 188 tonnes (99.7%) of total on-site final disposal.

Of these 25 NPRI-listed pollutants, the following six accounted for an estimated 94.3% of total on-site final disposals:

- hydrogen sulphide: 140 696 tonnes (77.4%);
- calcium fluoride: 10 094 tonnes (5.6%);
- ammonia (total): 7856 tonnes (4.3%);
- zinc (and its compounds): 6235 tonnes (3.4%);
- methanol: 3677 tonnes (2.0%); and
- manganese (and its compounds): 2845 tonnes (1.6%).

### *2.1.2 Industrial Sectors Reporting the Largest On-site Final Disposals in 2001*

In 2001, the following five industrial sectors reported the largest on-site final disposals, accounting for an estimated 170 360 tonnes (93.8%) of on-site final disposals (see Table 2-3):

- NAICS No. 2111, Oil and Gas Extraction: 128 392 tonnes (70.7%);
- NAICS No. 2131, Support Activities for Mining and Oil and Gas Extraction: 16 763 tonnes (9.2%);
- NAICS No. 3313, Alumina and Aluminum Production and Processing: 10 368 tonnes (5.7%);
- NAICS No. 5622, Waste Treatment and Disposal: 8829 tonnes (4.9%); and
- NAICS No. 3241, Petroleum and Coal Products Manufacturing: 6008 tonnes (3.3%).

Table 2-2 Twenty-five NPRI Pollutants Sent in the Largest Quantities for On-site Final Disposal in 2001

| | | On-site Final Disposal (tonnes) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CAS No. | Pollutant | Landfill | Land Treatment | Underground Injection | 2001 Total | 2000 Total | Change (2000–2001) | % change (2000–2001) |
| 7783-06-4 | Hydrogen sulphide | 0.0 | 0.0 | 140 695.7 | 140 695.7 | 148 462.2 | -7 766.4 | -5.2 |
| 7789-75-5 | Calcium fluoride | 10 094.1 | 0.0 | 0.0 | 10 094.1 | 11 622.2 | -1 528.1 | -13.1 |
| NA | Ammonia (total) | 16.9 | 673.0 | 7 166.5 | 7 856.4 | 8 080.0 | -223.5 | -2.8 |
| NA | Zinc (and its compounds) | 6 197.8 | 34.4 | 2.7 | 6 235.0 | 5 913.4 | 321.6 | 5.4 |
| 67-56-1 | Methanol | 17.0 | 4.4 | 3 655.4 | 3 676.8 | 4 153.4 | -476.6 | -11.5 |
| NA | Manganese (and its compounds) | 2 803.1 | 41.5 | 0.1 | 2 844.7 | 2 844.1 | 0.6 | 0.0 |
| NA | Lead (and its compounds) | 1 490.2 | 0.1 | 0.1 | 1 490.4 | 3 074.5 | -1 584.2 | -51.5 |
| NA | Selenium (and its compounds) | 947.8 | 0.0 | 0.0 | 947.8 | 10.1 | 937.8 | 9 312.6 |
| 1332-21-4 | Asbestos (friable form) | 893.0 | 0.0 | 0.0 | 893.0 | 3 144.1 | -2 251.1 | -71.6 |
| 1344-28-1 | Aluminum oxide (fibrous forms) | 759.6 | 0.0 | 0.0 | 759.6 | 0.0 | 759.6 | – |
| 7440-62-2 | Vanadium (and its compounds) | 702.8 | 2.6 | 0.0 | 705.3 | 1.9 | 703.4 | 36 867.4 |
| 78-93-3 | Methyl ethyl ketone | 0.0 | 0.0 | 687.2 | 687.2 | 1 290.0 | -602.8 | -46.7 |
| 107-21-1 | Ethylene glycol | 2.2 | 0.0 | 658.5 | 660.7 | 473.9 | 186.8 | 39.4 |
| NA | Chromium (and its compounds) | 647.3 | 0.0 | 5.9 | 653.2 | 334.0 | 319.3 | 95.6 |
| 111-42-2 | Diethanolamine (and its salts) | 0.0 | 0.0 | 574.0 | 574.0 | 668.6 | -94.6 | -14.1 |
| NA | Copper (and its compounds) | 542.1 | 0.0 | 0.0 | 542.2 | 386.7 | 155.5 | 40.2 |
| 85-44-9 | Phthalic anhydride | 402.8 | 0.0 | 0.0 | 402.8 | 760.2 | -357.4 | -47.0 |
| NA | Nitrate ion in solution at pH ≥6.0 | 0.1 | 122.5 | 216.6 | 339.2 | 458.6 | -119.4 | -26.0 |
| NA | Nickel (and its compounds) | 304.6 | 0.4 | 0.2 | 305.2 | 256.5 | 48.7 | 19.0 |
| 7664-93-9 | Sulphuric acid | 211.0 | 0.0 | 0.2 | 211.3 | 0.0 | 211.2 | 4 224 920.0 |
| NA | Cadmium (and its compounds) | 137.4 | 0.0 | 0.0 | 137.4 | 129.5 | 7.9 | 6.1 |
| NA | Arsenic (and its compounds) | 135.4 | 0.0 | 0.0 | 135.4 | 100.5 | 34.8 | 34.7 |
| 108-95-2 | Phenol (and its salts) | 0.0 | 0.0 | 118.4 | 118.4 | 9.3 | 109.1 | 1 176.0 |
| 110-54-3 | *n*-Hexane | 104.9 | 0.1 | 9.3 | 114.2 | 4.2 | 110.0 | 2 594.2 |
| 1330-20-7 | Xylene (mixed isomers) | 60.9 | 0.0 | 46.8 | 107.7 | 36.2 | 71.5 | 197.7 |
| **Largest on-site disposal** | | **26471.1** | **879.1** | **153 837.5** | **181 187.7** | **192 214.1** | **-11 026.3** | **-5.7** |
| **National total** | | **26697.1** | **879.9** | **154 104.3** | **181 681.3** | **193 447.9** | **-11 766.7** | **-6.1** |
| **% of national total** | | **99.2** | **99.9** | **99.8** | **99.7** | **99.4** | **0.4** | **0.4** |

Table 2-2 Twenty-five NPRI Pollutants Sent in the Largest Quantities for On-site Final Disposal in 2001

| | | On-site Final Disposal (tonnes) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CAS No. | Pollutant | Landfill | Land Treatment | Under-ground Injection | 2001 Total | 2000 Total | Change (2000–2001) | % change (2000–2001) |
| 7783-06-4 | Hydrogen sulphide | 0.0 | 0.0 | 140 695.7 | 140 695.7 | 148 462.2 | -7 766.4 | -5.2 |
| 7789-75-5 | Calcium fluoride | 10 094.1 | 0.0 | 0.0 | 10 094.1 | 11 622.2 | -1 528.1 | -13.1 |
| NA | Ammonia (total) | 16.9 | 673.0 | 7 166.5 | 7 856.4 | 8 080.0 | -223.5 | -2.8 |
| NA | Zinc (and its compounds) | 6 197.8 | 34.4 | 2.7 | 6 235.0 | 5 913.4 | 321.6 | 5.4 |
| 67-56-1 | Methanol | 17.0 | 4.4 | 3 655.4 | 3 676.8 | 4 153.4 | -476.6 | -11.5 |
| NA | Manganese (and its compounds) | 2 803.1 | 41.5 | 0.1 | 2 844.7 | 2 844.1 | 0.6 | 0.0 |
| NA | Lead (and its compounds) | 1 490.2 | 0.1 | 0.1 | 1 490.4 | 3 074.5 | -1 584.2 | -51.5 |
| NA | Selenium (and its compounds) | 947.8 | 0.0 | 0.0 | 947.8 | 10.1 | 937.8 | 9 312.6 |
| 1332-21-4 | Asbestos (friable form) | 893.0 | 0.0 | 0.0 | 893.0 | 3 144.1 | -2 251.1 | -71.6 |
| 1344-28-1 | Aluminum oxide (fibrous forms) | 759.6 | 0.0 | 0.0 | 759.6 | 0.0 | 759.6 | .. |
| 7440-62-2 | Vanadium (and its compounds) | 702.8 | 2.6 | 0.0 | 705.3 | 1.9 | 703.4 | 36 867.4 |
| 78-93-3 | Methyl ethyl ketone | 0.0 | 0.0 | 687.2 | 687.2 | 1 290.0 | -602.8 | -46.7 |
| 107-21-1 | Ethylene glycol | 2.2 | 0.0 | 658.5 | 660.7 | 473.9 | 186.8 | 39.4 |
| NA | Chromium (and its compounds) | 647.3 | 0.0 | 5.9 | 653.2 | 334.0 | 319.3 | 95.6 |
| 111-42-2 | Diethanolamine (and its salts) | 0.0 | 0.0 | 574.0 | 574.0 | 668.6 | -94.6 | -14.1 |
| NA | Copper (and its compounds) | 542.1 | 0.0 | 0.0 | 542.2 | 386.7 | 155.5 | 40.2 |
| 85-44-9 | Phthalic anhydride | 402.8 | 0.0 | 0.0 | 402.8 | 760.2 | -357.4 | -47.0 |
| NA | Nitrate ion in solution at pH ≥6.0 | 0.1 | 122.5 | 216.6 | 339.2 | 458.6 | -119.4 | -26.0 |
| NA | Nickel (and its compounds) | 304.6 | 0.4 | 0.2 | 305.2 | 256.5 | 48.7 | 19.0 |
| 7664-93-9 | Sulphuric acid | 211.0 | 0.0 | 0.2 | 211.3 | 0.0 | 211.2 | 4 224 920.0 |
| NA | Cadmium (and its compounds) | 137.4 | 0.0 | 0.0 | 137.4 | 129.5 | 7.9 | 6.1 |
| NA | Arsenic (and its compounds) | 135.4 | 0.0 | 0.0 | 135.4 | 100.5 | 34.8 | 34.7 |
| 108-95-2 | Phenol (and its salts) | 0.0 | 0.0 | 118.4 | 118.4 | 9.3 | 109.1 | 1 176.0 |
| 110-54-3 | *n*-Hexane | 104.9 | 0.1 | 9.3 | 114.2 | 4.2 | 110.0 | 2 594.2 |
| 1330-20-7 | Xylene (mixed isomers) | 60.9 | 0.0 | 46.8 | 107.7 | 36.2 | 71.5 | 197.7 |
| **Largest on-site disposal** | | **2 6471.1** | **879.1** | **153 837.5** | **181 187.7** | **192 214.1** | **-11 026.3** | **-5.7** |
| **National total** | | **2 6697.1** | **879.9** | **154 104.3** | **181 681.3** | **193 447.9** | **-11 766.7** | **-6.1** |
| **% of national total** | | **99.2** | **99.9** | **99.8** | **99.7** | **99.4** | **0.4** | **0.4** |

Table 2-3 Industrial Sectors Reporting the Largest On-site Final Disposals of NPRI-listed Pollutants in 2001

| | | On-site Final Disposal (tonnes) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CAS No. | Pollutant | Landfill | Land Treatment | Underground Injection | 2001 Total | 2000 Total | Change (2000–2001) | % change (2000–2001) |
| **1. NAICS No. 2111 – Oil and Gas Extraction:** | | | | | | | | |
| 7783-06-4 | Hydrogen sulphide | 0.0 | 0.0 | 124 386.3 | 124 386.3 | 126 869.4 | -2 483.0 | -2.0 |
| 67-56-1 | Methanol | 0.0 | 0.0 | 1 937.3 | 1 937.3 | 2 186.3 | -249.0 | -11.4 |
| 1332-21-4 | Asbestos (friable form) | 763.3 | 0.0 | 0.0 | 763.3 | 426.4 | 336.9 | 79.0 |
| 107-21-1 | Ethylene glycol | 0.0 | 0.0 | 592.0 | 592.0 | 378.9 | 213.0 | 56.2 |
| 111-42-2 | Diethanolamine (and its salts) | 0.0 | 0.0 | 574.0 | 574.0 | 668.6 | -94.6 | -14.1 |
| **Total all substances in sector** | | **763.7** | **0.0** | **127 628.1** | **128 391.8** | **130 694.7** | **-2 302.9** | **-1.8** |
| **2. NAICS No. 2131 – Support Activities for Mining and Oil and Gas Extractions:** | | | | | | | | |
| 7783-06-4 | Hydrogen sulphide | 0.0 | 0.0 | 16 260.0 | 16 260.0 | 21 523.0 | -5 263.0 | -24.5 |
| 67-56-1 | Methanol | 0.0 | 0.0 | 337.8 | 337.8 | 397.6 | -59.8 | -15.0 |
| 110-54-3 | *n*-Hexane | 104.7 | 0.0 | 0.0 | 104.7 | 0.0 | 104.7 | – |
| 1330-20-7 | Xylene (mixed isomers) | 60.3 | 0.0 | 0.0 | 60.3 | 0.0 | 60.3 | – |
| 100-41-4 | Ethylbenzene | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | – |
| **Total all substances in sector** | | **165.0** | **0.0** | **16 597.8** | **16 762.7** | **21 920.6** | **-5 157.8** | **-23.5** |
| **3. NAICS No. 3313 – Alumina and Aluminum Production and Processing:** | | | | | | | | |
| 7789-75-5 | Calcium fluoride | 10 092.0 | 0.0 | 0.0 | 10 092.0 | 11 617.0 | -1 525.0 | -13.1 |
| 7664-93-9 | Sulphuric acid | 211.0 | 0.0 | 0.0 | 211.0 | 0.0 | 211.0 | – |
| NA | PAH | 59.5 | 0.0 | 0.0 | 59.5 | 1.8 | 57.7 | 3212.7 |
| 120-12-7 | Anthracene | 5.1 | 0.0 | 0.0 | 5.1 | 0.0 | 5.1 | – |
| NA | Zinc (and its compounds) | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | – |
| **Total all substances in sector** | | **10 367.6** | **0.0** | **0.0** | **10 367.6** | **11 618.8** | **-1 251.2** | **-10.8** |
| **4. NAICS No. 5622 – Waste Treatment and Disposal:** | | | | | | | | |
| NA | Zinc (and its compounds) | 4 170.1 | 0.0 | 0.0 | 4 170.1 | 3 247.2 | 922.8 | 28.4 |
| NA | Lead (and its compounds) | 1 186.0 | 0.0 | 0.0 | 1 186.0 | 2 699.3 | -1 513.3 | -56.1 |
| NA | Selenium (and its compounds) | 939.8 | 0.0 | 0.0 | 939.8 | 0.0 | 939.8 | – |
| 1344-28-1 | Aluminum oxide (fibrous forms) | 759.6 | 0.0 | 0.0 | 759.6 | 0.0 | 759.6 | – |
| NA | Manganese (and its compounds) | 457.4 | 0.0 | 0.0 | 457.4 | 281.8 | 175.6 | 62.3 |
| **Total all substances in sector** | | **8 829.4** | **0.0** | **0.0** | **8 829.4** | **9 912.6** | **-1 083.2** | **-10.9** |
| **5. NAICS No. 3241 – Petroleum and Coal Products Manufacturing:** | | | | | | | | |
| NA | Ammonia (total) | 0.0 | 0.0 | 5 534.5 | 5 534.5 | 5 413.2 | 121.3 | 2.2 |
| 67-56-1 | Methanol | 0.0 | 0.0 | 187.7 | 187.7 | 0.0 | 187.7 | – |
| 108-95-2 | Phenol (and its salts) | 0.0 | 0.0 | 118.4 | 118.4 | 9.3 | 109.1 | 1175.9 |
| 7783-06-4 | Hydrogen sulphide | 0.0 | 0.0 | 49.4 | 49.4 | 69.8 | -20.4 | -29.3 |
| 107-21-1 | Ethylene glycol | 0.0 | 0.0 | 29.7 | 29.7 | 92.3 | -62.7 | -67.9 |
| **Total all substances in sector** | | **1.9** | **2.4** | **6 003.9** | **6 008.2** | **5 683.4** | **324.8** | **5.7** |

## 2.2 Off-site Final Disposal in 2001

Facilities reported an estimated 38 208 tonnes of NPRI-listed pollutants that were sent for off-site final disposal in 2001, a decrease of 3346 tonnes (or -8.1%) from 2000. The following breakdown summarizes off-site final disposal activities in 2001 (see Figure 2-2):

- landfill: 24 280 tonnes (63.5%), an overall decrease of an estimated 5398 tonnes (or -18.2%) from 2000;
- land treatment: 2472 tonnes (6.5%), an overall increase of an estimated 827 tonnes (or +50.3%) from 2000;
- underground injection: 9078 tonnes (23.8%), an overall increase of an estimated 959 tonnes (or +11.8%) from 2000; and
- storage: 2378 tonnes (6.2%), an overall increase of an estimated 266 tonnes (or +12.6%) from 2000.

Table 2-3 Industrial Sectors Reporting the Largest On-site Final Disposals of NPRI-listed Pollutants in 2001

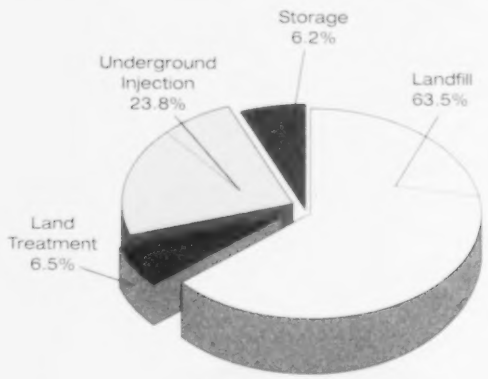
| CAS No. | Pollutant | On-site Final Disposal (tonnes) Landfill | Land Treatment | Underground Injection | 2001 Total | 2000 Total | Change (2000–2001) | % change (2000–2001) |
|---|---|---|---|---|---|---|---|---|
| **1. NAICS No. 2111 – Oil and Gas Extraction:** | | | | | | | | |
| 7783-06-4 | Hydrogen sulphide | 0.0 | 0.0 | 124 386.3 | 124 386.3 | 126 869.4 | -2 483.0 | -2.0 |
| 67-56-1 | Methanol | 0.0 | 0.0 | 1 937.3 | 1 937.3 | 2 186.3 | -249.0 | -11.4 |
| 1332-21-4 | Asbestos (friable form) | 763.3 | 0.0 | 0.0 | 763.3 | 426.4 | 336.9 | 79.0 |
| 107-21-1 | Ethylene glycol | 0.0 | 0.0 | 592.0 | 592.0 | 378.9 | 213.0 | 56.2 |
| 111-42-2 | Diethanolamine (and its salts) | 0.0 | 0.0 | 574.0 | 574.0 | 668.6 | -94.6 | -14.1 |
| **Total all substances in sector** | | **763.7** | **0.0** | **127 628.1** | **128 391.8** | **130 694.7** | **-2 302.9** | **-1.8** |
| **2. NAICS No. 2131 – Support Activities for Mining and Oil and Gas Extractions:** | | | | | | | | |
| 7783-06-4 | Hydrogen sulphide | 0.0 | 0.0 | 16 260.0 | 16 260.0 | 21 523.0 | -5 263.0 | -24.5 |
| 67-56-1 | Methanol | 0.0 | 0.0 | 337.8 | 337.8 | 397.6 | -59.8 | -15.0 |
| 110-54-3 | *n*-Hexane | 104.7 | 0.0 | 0.0 | 104.7 | 0.0 | 104.7 | – |
| 1330-20-7 | Xylene (mixed isomers) | 60.3 | 0.0 | 0.0 | 60.3 | 0.0 | 60.3 | – |
| 100-41-4 | Ethylbenzene | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | – |
| **Total all substances in sector** | | **165.0** | **0.0** | **16 597.8** | **16 762.7** | **21 920.6** | **-5 157.8** | **-23.5** |
| **3. NAICS No. 3313 – Alumina and Aluminum Production and Processing:** | | | | | | | | |
| 7789-75-5 | Calcium fluoride | 10 092.0 | 0.0 | 0.0 | 10 092.0 | 11 617.0 | -1 525.0 | -13.1 |
| 7664-93-9 | Sulphuric acid | 211.0 | 0.0 | 0.0 | 211.0 | 0.0 | 211.0 | – |
| NA | PAH | 59.5 | 0.0 | 0.0 | 59.5 | 1.8 | 57.7 | 3212.7 |
| 120-12-7 | Anthracene | 5.1 | 0.0 | 0.0 | 5.1 | 0.0 | 5.1 | – |
| NA | Zinc (and its compounds) | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | – |
| **Total all substances in sector** | | **10 367.6** | **0.0** | **0.0** | **10 367.6** | **11 618.8** | **-1 251.2** | **-10.8** |
| **4. NAICS No. 5622 – Waste Treatment and Disposal:** | | | | | | | | |
| NA | Zinc (and its compounds) | 4 170.1 | 0.0 | 0.0 | 4 170.1 | 3 247.2 | 922.8 | 28.4 |
| NA | Lead (and its compounds) | 1 186.0 | 0.0 | 0.0 | 1 186.0 | 2 699.3 | -1 513.3 | -56.1 |
| NA | Selenium (and its compounds) | 939.8 | 0.0 | 0.0 | 939.8 | 0.0 | 939.8 | – |
| 1344-28-1 | Aluminum oxide (fibrous forms) | 759.6 | 0.0 | 0.0 | 759.6 | 0.0 | 759.6 | – |
| NA | Manganese (and its compounds) | 457.4 | 0.0 | 0.0 | 457.4 | 281.8 | 175.6 | 62.3 |
| **Total all substances in sector** | | **8 829.4** | **0.0** | **0.0** | **8 829.4** | **9 912.6** | **-1 083.2** | **-10.9** |
| **5. NAICS No. 3241 – Petroleum and Coal Products Manufacturing:** | | | | | | | | |
| NA | Ammonia (total) | 0.0 | 0.0 | 5 534.5 | 5 534.5 | 5 413.2 | 121.3 | 2.2 |
| 67-56-1 | Methanol | 0.0 | 0.0 | 187.7 | 187.7 | 0.0 | 187.7 | – |
| 108-95-2 | Phenol (and its salts) | 0.0 | 0.0 | 118.4 | 118.4 | 9.3 | 109.1 | 1175.9 |
| 7783-06-4 | Hydrogen sulphide | 0.0 | 0.0 | 49.4 | 49.4 | 69.8 | -20.4 | -29.3 |
| 107-21-1 | Ethylene glycol | 0.0 | 0.0 | 29.7 | 29.7 | 92.3 | -62.7 | -67.9 |
| **Total all substances in sector** | | **1.9** | **2.4** | **6 003.9** | **6 008.2** | **5 683.4** | **324.8** | **5.7** |

## 2.2 Off-site Final Disposal in 2001

Facilities reported an estimated 38 208 tonnes of NPRI-listed pollutants that were sent for off-site final disposal in 2001, a decrease of 3346 tonnes (or -8.1%) from 2000. The following breakdown summarizes off-site final disposal activities in 2001 (see Figure 2-2):

- landfill: 24 280 tonnes (63.5%), an overall decrease of an estimated 5398 tonnes (or -18.2%) from 2000;
- land treatment: 2472 tonnes (6.5%), an overall increase of an estimated 827 tonnes (or +50.3%) from 2000;
- underground injection: 9078 tonnes (23.8%), an overall increase of an estimated 959 tonnes (or +11.8%) from 2000; and
- storage: 2378 tonnes (6.2%), an overall increase of an estimated 266 tonnes (or +12.6%) from 2000.

**Figure 2-2 Off-site Final Disposal in 2001**




The decrease that was reported from **off-site final disposal — landfill** was mainly attributed to a reduction of an estimated 4030 tonnes (or -51.2%) of zinc (and its compounds) from the Iron and Steel Mills and Ferro-Alloy Manufacturing (NAICS No. 3311) industrial sector. The increase that was reported from **off-site final disposal — land treatment** was mainly due to an estimated 1553 tonnes of ammonia (total) reported from the Water, Sewage and Other Systems (NAICS No. 2213) industrial sector.

As noted above, it is important to note that increases and decreases in the final disposal of pollutants can be attributed to numerous factors (these factors should be considered when using NPRI information), including, but not limited to, the following:

- facilities reporting to the NPRI for the first time;
- facilities using improved estimation methodologies;
- changes in facility infrastructure and processes/operations; and
- use of pollution prevention techniques.

### 2.2.1 *Twenty-five NPRI Pollutants Sent in Largest Quantities for Off-site Final Disposal in 2001*

Table 2-4 highlights the 25 NPRI-listed pollutants sent in the largest quantities for off-site final disposal in 2001, by disposal method. These 25 pollutants accounted for an estimated 37 262 tonnes (97.5%) of total off-site final disposals.

Of these 25 NPRI-listed pollutants, the following six accounted for an estimated 70.9% of total off-site final disposals:

- zinc (and its compounds): 6908 tonnes (18.1%);
- manganese (and its compounds): 4649 tonnes (12.2%);
- calcium fluoride: 4522 tonnes (11.8%);
- sulphuric acid: 4373 tonnes (11.4%);
- ammonia (total): 3503 tonnes (9.2%); and
- methanol: 3131 tonnes (8.2%).

### 2.2.2 *Industrial Sectors Reporting the Largest Off-site Final Disposals in 2001*

In 2001, the following five industrial sectors reported the largest off-site final disposals, accounting for an estimated 24 210 tonnes (63.4% of the total) (see Table 2-5):

- NAICS No. 3311, Iron and Steel Mills and Ferro-Alloy Manufacturing: 6562 tonnes (17.2%);
- NAICS No. 5622, Waste Treatment and Disposal: 4823 tonnes (12.6%);
- NAICS No. 3251, Basic Chemical Manufacturing: 4716 tonnes (12.3%);
- NAICS No. 3313, Alumina and Aluminum Production and Processing: 4575 tonnes (12.0%); and
- NAICS No. 2111, Oil and Gas Extraction: 3535 tonnes (9.2%).

## Table 2-4 Twenty-five NPRI Pollutants Sent in the Largest Quantities for Off-site Final Disposal in 2001

| | | Off-site Final Disposal (tonnes) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CAS No. | Pollutant | Landfill | Storage | Underground Injection | Land Treatment | 2001 Total | 2000 Total | Change (2000–2001) | % change (2000–2001) |
| NA | Zinc (and its compounds) | 6 519.2 | 264.4 | 77.9 | 46.0 | 6 907.6 | 11 105.6 | -4 198.1 | -37.8 |
| NA | Manganese (and its compounds) | 4 249.6 | 302.7 | 0.0 | 97.0 | 4 649.3 | 5 363.4 | -714.1 | -13.3 |
| 7789-75-5 | Calcium fluoride | 4 522.4 | 0.0 | 0.0 | 0.0 | 4 522.4 | 2 863.9 | 1 658.4 | 57.9 |
| 7664-93-9 | Sulphuric acid | 230.2 | 4.8 | 4 137.9 | 0.0 | 4 373.0 | 4 229.2 | 143.8 | 3.4 |
| NA | Ammonia (total) | 787.0 | 470.9 | 235.9 | 2 009.1 | 3 502.9 | 1 868.9 | 1 634.0 | 87.4 |
| 67-56-1 | Methanol | 14.3 | 0.5 | 3 116.3 | 0.0 | 3 131.2 | 2 372.7 | 758.6 | 32.0 |
| 1332-21-4 | Asbestos (friable form) | 1 642.9 | 0.0 | 0.0 | 3.9 | 1 646.7 | 1 643.0 | 3.7 | 0.2 |
| NA | Lead (and its compounds) | 1 357.7 | 131.8 | 0.1 | 2.4 | 1 491.9 | 1 450.4 | 41.5 | 2.9 |
| NA | Chromium (and its compounds) | 1 149.5 | 96.8 | 230.1 | 0.0 | 1 476.4 | 2 674.4 | -1 198.0 | -44.8 |
| NA | Nitrate ion in solution at pH ≥6.0 | 72.8 | 0.0 | 855.0 | 91.0 | 1 018.8 | 830.3 | 188.5 | 22.7 |
| NA | Copper (and its compounds) | 868.0 | 120.5 | 0.0 | 22.1 | 1 010.5 | 991.6 | 19.0 | 1.9 |
| 1330-20-7 | Xylene (mixed isomers) | 371.1 | 410.8 | 26.7 | 58.9 | 867.4 | 1 165.2 | -297.9 | -25.6 |
| NA | Nickel (and its compounds) | 527.4 | 46.7 | 18.8 | 0.0 | 592.9 | 668.3 | -75.4 | -11.3 |
| 108-88-3 | Toluene | 161.9 | 190.3 | 35.0 | 52.6 | 439.9 | 637.2 | -197.3 | -31.0 |
| 7440-62-2 | Vanadium (and its compounds) | 169.1 | 101.7 | 0.0 | 0.0 | 270.8 | 0.2 | 270.6 | 139 484.0 |
| 7429-90-5 | Aluminum (fume or dust) | 191.2 | 0.0 | 0.0 | 0.0 | 191.2 | 298.5 | -107.4 | -36.0 |
| 78-93-3 | Methyl ethyl ketone | 75.7 | 89.0 | 5.5 | 0.0 | 170.2 | 220.2 | -50.0 | -22.7 |
| NA | PAHs (combined total) | 168.3 | 0.0 | 0.0 | 0.0 | 168.3 | 88.9 | 79.4 | 89.4 |
| NA | Cadmium (and its compounds) | 149.1 | 6.8 | 0.0 | 0.2 | 156.1 | 133.9 | 22.2 | 16.6 |
| 107-21-1 | Ethylene glycol | 13.2 | 15.2 | 122.8 | 0.0 | 151.1 | 483.0 | -331.9 | -68.7 |
| 7697-37-2 | Nitric acid | 28.0 | 0.0 | 120.0 | 0.0 | 148.0 | 196.0 | -48.0 | -24.5 |
| 50-00-0 | Formaldehyde | 102.4 | 0.9 | 0.0 | 0.0 | 103.3 | 87.5 | 15.9 | 18.1 |
| NA | Arsenic (and its compounds) | 100.6 | 0.1 | 0.0 | 0.0 | 100.6 | 114.0 | -13.4 | -11.7 |
| 1313-27-5 | Molybdenum trioxide | 90.2 | 0.0 | 0.0 | 0.0 | 90.2 | 6.4 | 83.9 | 1 318.3 |
| 1344-28-1 | Aluminum oxide (fibrous forms) | 81.5 | 0.0 | 0.0 | 0.0 | 81.5 | 104.7 | -23.3 | -22.2 |
| **Largest off-site transfers** | | **23 643.2** | **2 254.0** | **8 981.9** | **2 383.2** | **37 262.2** | **39 597.6** | **-2 335.4** | **-5.9** |
| **National total** | | **24 279.7** | **2 377.7** | **9 078.4** | **2 472.3** | **38 208.1** | **41 553.6** | **-3 345.5** | **-8.1** |
| **% of national total** | | **97.4** | **94.8** | **98.9** | **96.4** | **97.5** | **95.3** | **2.2** | **2.3** |

## Table 2-5 Industrial Sectors Reporting the Largest Off-site Final Disposals of NPRI-listed Pollutants in 2001

| | | Off-site Final Disposal (tonnes) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CAS No. | Pollutant | Landfill | Storage | Under-ground Injection | Land Treat-ment | 2001 Total | 2000 Total | Change (2000–2001) | % change (2000–2001) |
| **1. NAICS No. 3311 – Iron and Steel Mills and Ferro-Alloy Manufacturing:** | | | | | | | | | |
| NA | Zinc (and its compounds) | 3 846.8 | 0.0 | 0.0 | 0.0 | 3 846.8 | 7 876.4 | -4 029.6 | -51.2 |
| NA | Manganese (and its compounds) | 1 650.3 | 0.0 | 0.0 | 0.0 | 1 650.3 | 2 391.0 | -740.7 | -31.0 |
| NA | Chromium (and its compounds) | 312.5 | 0.0 | 0.0 | 0.0 | 312.5 | 339.7 | -27.2 | -8.0 |
| NA | Lead (and its compounds) | 268.4 | 0.0 | 0.0 | 0.0 | 268.4 | 328.4 | -60.0 | -18.3 |
| 1332-21-4 | Asbestos (friable form) | 236.2 | 0.0 | 0.0 | 0.0 | 236.2 | 217.7 | 18.5 | 8.5 |
| **Total all substances in sector** | | **6 562.2** | **0.0** | **0.0** | **0.0** | **6 562.2** | **11 488.7** | **-4 926.5** | **-42.9** |
| **2. NAICS No. 5622 – Waste Treatment and Disposal:** | | | | | | | | | |
| NA | Zinc (and its compounds) | 916.7 | 20.5 | 74.1 | 0.0 | 1 011.3 | 1 349.8 | -338.5 | -25.1 |
| NA | Nitrate ion in solution at pH ≥6.0 | 59.9 | 0.0 | 848.9 | 0.0 | 908.8 | 707.0 | 201.8 | 28.5 |
| 1330-20-7 | Xylene (mixed isomers) | 289.4 | 391.6 | 0.0 | 0.0 | 681.0 | 1 029.9 | -348.9 | -33.9 |
| NA | Chromium (and its compounds) | 319.2 | 26.6 | 230.1 | 0.0 | 576.0 | 742.1 | -166.1 | -22.4 |
| NA | Copper (and its compounds) | 407.8 | 6.2 | 0.0 | 0.0 | 414.0 | 307.8 | 106.2 | 34.5 |
| **Total all substances in sector** | | **2 814.2** | **824.4** | **1 184.1** | **0.0** | **4 822.8** | **6 381.1** | **-1 558.3** | **-24.4** |
| **3. NAICS No. 3251 – Basic Chemical Manufacturing:** | | | | | | | | | |
| 7664-93-9 | Sulphuric acid | 0.4 | 0.0 | 4 120.0 | 0.0 | 4 120.4 | 3 650.1 | 470.3 | 12.9 |
| 7789-75-5 | Calcium fluoride | 194.0 | 0.0 | 0.0 | 0.0 | 194.0 | 224.6 | -30.6 | -13.6 |
| 1332-21-4 | Asbestos (friable form) | 142.3 | 0.0 | 0.0 | 0.0 | 142.3 | 280.7 | -138.3 | -49.3 |
| 7697-37-2 | Nitric acid | 0.0 | 0.0 | 120.0 | 0.0 | 120.0 | 130.0 | -10.0 | -7.7 |
| 107-21-1 | Ethylene glycol | 2.0 | 0.0 | 38.9 | 0.0 | 40.9 | 33.9 | 7.0 | 20.5 |
| **Total all substances in sector** | | **403.5** | **1.2** | **4 310.9** | **0.0** | **4 715.5** | **4 410.7** | **304.9** | **6.9** |
| **4. NAICS No. 3313 – Alumina and Aluminum Production and Processing:** | | | | | | | | | |
| 7789-75-5 | Calcium fluoride | 4 319.3 | 0.0 | 0.0 | 0.0 | 4 319.3 | 2 631.5 | 1 687.7 | 64.1 |
| NA | PAHs (combined total) | 130.2 | 0.0 | 0.0 | 0.0 | 130.2 | 41.1 | 89.2 | 217.1 |
| 7429-90-5 | Aluminum (fume or dust) | 62.7 | 0.0 | 0.0 | 0.0 | 62.7 | 85.0 | -22.3 | -26.2 |
| 1330-20-7 | Xylene (mixed isomers) | 7.8 | 18.2 | 0.0 | 0.0 | 26.0 | 0.0 | 26.0 | – |
| NA | Zinc (and its compounds) | 10.7 | 0.0 | 0.0 | 0.0 | 10.7 | 7.6 | 3.1 | 40.5 |
| **Total all substances in sector** | | **4 556.6** | **18.2** | **0.0** | **0.0** | **4 574.8** | **2 793.6** | **1 781.2** | **63.8** |
| **5. NAICS No. 2111 – Oil and Gas Extraction:** | | | | | | | | | |
| 67-56-1 | Methanol | 0.0 | 0.0 | 3 081.8 | 0.0 | 3 081.8 | 2 272.6 | 809.2 | 35.6 |
| 108-88-3 | Toluene | 0.8 | 0.0 | 23.7 | 52.6 | 77.1 | 51.9 | 25.2 | 48.7 |
| 1330-20-7 | Xylene (mixed isomers) | 1.8 | 0.0 | 16.4 | 58.9 | 77.1 | 49.8 | 27.3 | 54.7 |
| 107-21-1 | Ethylene glycol | 0.5 | 0.0 | 64.0 | 0.0 | 64.5 | 103.7 | -39.3 | -37.8 |
| 1332-21-4 | Asbestos (friable form) | 58.4 | 0.0 | 0.0 | 3.9 | 62.2 | 81.1 | -18.8 | -23.2 |
| **Total all substances in sector** | | **69.9** | **0.3** | **3 260.7** | **204.3** | **3 535.2** | **2 839.9** | **695.3** | **24.5** |

# 3 SUMMARY OF OFF-SITE TRANSFERS FOR TREATMENT PRIOR TO FINAL DISPOSAL IN 2001

In 2001, 2618 facilities across Canada reported to the NPRI, of which 744 facilities submitted data on off-site transfers for treatment prior to final disposal totalling an estimated 39 849 tonnes (see Table 3-1).

The following breakdown summarizes off-site transfers for treatment prior to final disposal activities in 2001 (see Figure 3-1):

- physical treatment: 1819 tonnes (4.6%), an overall decrease of an estimated 1071 tonnes (or -37.1%) from 2000;
- chemical treatment: 12 187 tonnes (30.6%), an overall increase of an estimated 728 tonnes (or +6.4%) from 2000;
- biological treatment: 2444 tonnes (6.1%), an overall decrease of an estimated 527 tonnes (or -17.7%) from 2000;
- incineration: 9444 tonnes (23.7%), an overall decrease of an estimated 1108 tonnes (or -10.5%) from 2000; and
- treatment at municipal sewage treatment plant: 13 956 tonnes (35.0%), an overall increase of an estimated 1559 tonnes (or +12.6 %) from 2000.

The increase that was reported from **chemical treatment** was mainly attributed to the following in 2001:

- 1847 tonnes of zinc (and its compounds) transferred off site from the Iron and Steel Mills and Ferro-Alloy Manufacturing industrial sector (NAICS No. 3311); and
- 1967 tonnes of hydrochloric acid transferred off site from the Other Fabricated Metal Product Manufacturing industrial sector (NAICS No. 3329).

It is important to note that increases and decreases in the final disposal of pollutants can be attributed to numerous factors (these factors should be considered when using NPRI information), including, but not limited to, the following:

- facilities reporting to the NPRI for the first time;
- facilities using improved estimation methodologies;
- changes in facility infrastructure and processes/operations; and
- use of pollution prevention techniques.

**Table 3-1 National Summary of Off-site Transfers for Treatment Prior to Final Disposal in 2001** [A]

| | 2000 | 2001 | Change (2000–2001) | % change (2000–2001) |
|---|---|---|---|---|
| Total facilities | 725 | 744 | 19 | 2.6 |
| Total reports | 2 200 | 2 267 | 67 | 3.0 |
| Pollutants reported | 154 | 149 | -5 | -3.2 |
| Off-site transfers for treatment prior to final disposal (tonnes): | | | | |
| Physical treatment | 2 890.2 | 1 819.1 | -1 071.1 | -37.1 |
| Chemical treatment | 11 459.3 | 12 187.0 | 727.7 | 6.4 |
| Biological treatment | 2 970.4 | 2 443.8 | -526.6 | -17.7 |
| Incineration | 10 551.9 | 9 443.9 | -1 108.0 | -10.5 |
| Treatment at municipal sewage treatment plant | 12 396.5 | 13 955.5 | 1 559.0 | 12.6 |
| **Total off-site treatment** | **40 268.3** | **39 849.3** | **-419.0** | **-1.0** |

[A] Because of rounding of release and transfer quantities, the totals may not equal the sum of the individual values.

# 3 SUMMARY OF OFF-SITE TRANSFERS FOR TREATMENT PRIOR TO FINAL DISPOSAL IN 2001

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- facilities reporting to the NPRI for the first time;
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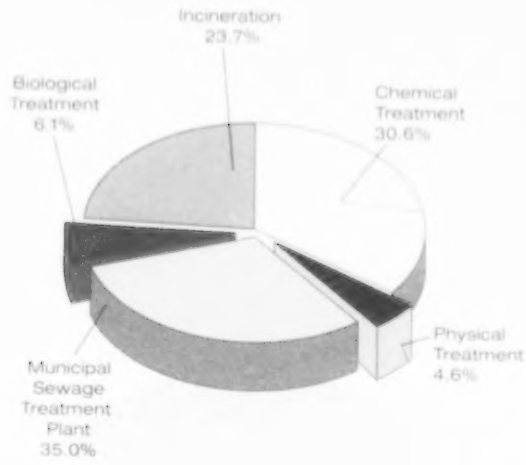
| Off-site transfers for treatment prior to final disposal (tonnes): | | | | |
| Physical treatment | 2 890.2 | 1 819.1 | -1 071.1 | -37.1 |
| Chemical treatment | 11 459.3 | 12 187.0 | 727.7 | 6.4 |
| Biological treatment | 2 970.4 | 2 443.8 | -526.6 | -17.7 |
| Incineration | 10 551.9 | 9 443.9 | -1 108.0 | -10.5 |
| Treatment at municipal sewage treatment plant | 12 396.5 | 13 955.5 | 1 559.0 | 12.6 |
| **Total off-site treatment** | **40 268.3** | **39 849.3** | **-419.0** | **-1.0** |

[A] Because of rounding of release and transfer quantities, the totals may not equal the sum of the individual values.

**Figure 3-1 Off-site Transfers for Treatment Prior to Final Disposal in 2001**




### 3.1 Twenty-five NPRI Pollutants Sent in Largest Quantities for Off-site Transfers for Treatment Prior to Final Disposal in 2001

Table 3-2 highlights the 25 NPRI-listed pollutants sent in the largest quantities for off-site transfers for treatment prior to final disposal in 2001 by treatment activity. These 25 pollutants accounted for an estimated 37 729 tonnes (94.7%) of total off-site transfers for treatment prior to final disposal.

Of these 25 NPRI-listed pollutants, the following six accounted for an estimated 24 240 tonnes (60.8%) of total off-site transfers for treatment prior to final disposal:

- hydrochloric acid: 5778 tonnes (14.5%);
- nitrate ion in solution (at a pH of 6.0 or greater): 5332 tonnes (13.4%);
- ethylene glycol: 4786 tonnes (12.0%);
- sulphuric acid: 3084 tonnes (7.7%);
- methanol: 2881 tonnes (7.2%); and
- zinc (and its compounds): 2380 tonnes (6.0%).

### 3.2 Industrial Sectors Reporting the Largest Off-site Transfers for Treatment Prior to Final Disposal in 2001

In 2001, the following five industrial sectors reported the largest off-site transfers for treatment prior to final disposal, accounting for an estimated 19 944 tonnes (50.0%) of the total (see Table 3-3):

- NAICS No. 3251, Basic Chemical Manufacturing: 6606 tonnes (16.6%);
- NAICS No. 4881, Support Activities for Air Transportation: 3758 tonnes (9.4%);
- NAICS No. 3311, Iron and Steel Mills and Ferro-Alloy Manufacturing: 3350 tonnes (8.4%);
- NAICS No. 3329, Other Fabricated Metal Product Manufacturing: 3194 tonnes (8.0%); and
- NAICS No. 2329, Other Special Trade Contracting: 3036 tonnes (7.6%).

## Table 3-2 Twenty-five NPRI Pollutants Transferred Off Site in Largest Quantities for Treatment Prior to Final Disposal in 2001

| | | Off-site Transfers for Treatment Prior to Final Disposal (tonnes) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| CAS No. | Pollutant | Physical | Chemical | Biological | Incin-eration | MSTP | 2001 Total | 2001 Total | Change (2000–2001) | % change (2000–2001) |
| 7647-01-0 | Hydrochloric acid | 311.1 | 4 075.2 | 0.0 | 24.4 | 1 367.0 | 5 777.7 | 4 353.2 | 1 424.5 | 32.7 |
| NA | Nitrate ion in solution at pH ≥6.0 | 10.1 | 6.9 | 21.9 | 78.1 | 5 215.0 | 5 331.9 | 5 639.0 | -307.1 | -5.4 |
| 107-21-1 | Ethylene glycol | 21.5 | 26.7 | 2 029.7 | 403.3 | 2 304.4 | 4 785.6 | 3 433.4 | 1 352.2 | 39.4 |
| 7664-93-9 | Sulphuric acid | 11.9 | 2 280.6 | 0.0 | 156.6 | 635.2 | 3 084.3 | 5 229.5 | -2 145.2 | -41.0 |
| 67-56-1 | Methanol | 138.6 | 42.4 | 3.0 | 1 244.2 | 1 452.5 | 2 880.7 | 2 256.0 | 624.7 | 27.7 |
| NA | Zinc (and its compounds) | 96.6 | 2 210.1 | 7.7 | 54.9 | 10.5 | 2 379.7 | 1 886.8 | 492.9 | 26.1 |
| NA | Ammonia (total) | 11.6 | 10.2 | 242.6 | 2.4 | 1 979.5 | 2 246.2 | 2 271.3 | -25.1 | -1.1 |
| 108-88-3 | Toluene | 20.9 | 76.9 | 3.6 | 1 579.8 | 37.1 | 1 718.3 | 2 539.4 | -821.1 | -32.3 |
| 1330-20-7 | Xylene (mixed isomers) | 13.4 | 131.5 | 32.8 | 1 140.5 | 0.4 | 1 318.6 | 1 673.6 | -355.0 | -21.2 |
| 67-63-0 | Isopropyl alcohol | 18.5 | 30.0 | 9.6 | 1 102.0 | 111.2 | 1 271.4 | 1 146.2 | 125.1 | 10.9 |
| 7789-75-5 | Calcium fluoride | 261.1 | 999.7 | 0.0 | 0.0 | 0.0 | 1 260.9 | 911.1 | 349.8 | 38.4 |
| 7697-37-2 | Nitric acid | 0.0 | 893.4 | 0.0 | 128.3 | 90.5 | 1 112.1 | 1 128.7 | -16.6 | -1.5 |
| 78-93-3 | Methyl ethyl ketone | 10.2 | 65.3 | 0.0 | 632.1 | 81.4 | 789.1 | 845.0 | -55.9 | -6.6 |
| NA | Manganese (and its compounds) | 124.2 | 329.0 | 9.5 | 6.5 | 11.7 | 481.0 | 573.4 | -92.4 | -16.1 |
| NA | Chromium (and its compounds) | 199.8 | 184.9 | 0.0 | 16.6 | 10.9 | 412.1 | 788.8 | -376.7 | -47.8 |
| 111-42-2 | Diethanolamine (and its salts) | 256.9 | 5.1 | 0.0 | 114.6 | 0.0 | 376.7 | 76.4 | 300.3 | 393.0 |
| NA | Nickel (and its compounds) | 106.6 | 250.0 | 0.0 | 9.3 | 3.7 | 369.6 | 399.5 | -29.9 | -7.5 |
| 108-10-1 | Methyl isobutyl ketone | 2.7 | 18.5 | 0.0 | 337.4 | 0.0 | 358.6 | 319.5 | 39.1 | 12.2 |
| 71-36-3 | *n*-Butyl alcohol | 1.2 | 8.8 | 18.0 | 302.6 | 15.7 | 346.2 | 446.6 | -100.3 | -22.5 |
| 110-54-3 | *n*-Hexane | 0.9 | 1.9 | 58.3 | 237.1 | 0.6 | 298.9 | 250.6 | 48.3 | 19.3 |
| 111-76-2 | 2-Butoxyethanol | 10.8 | 6.1 | 0.0 | 65.0 | 163.2 | 245.1 | 212.5 | 32.5 | 15.3 |
| 110-82-7 | Cyclohexane | 1.0 | 1.1 | 0.0 | 232.1 | 0.0 | 234.1 | 161.7 | 72.4 | 44.8 |
| NA | Lead (and its compounds) | 7.0 | 199.0 | 0.0 | 10.7 | 2.0 | 218.6 | 306.3 | -87.7 | -28.6 |
| 108-95-2 | Phenol (and its salts) | 0.0 | 4.0 | 0.5 | 151.0 | 60.4 | 215.8 | 273.5 | -57.6 | -21.1 |
| 50-00-0 | Formaldehyde | 0.0 | 8.5 | 4.2 | 99.4 | 103.8 | 215.8 | 283.7 | -67.9 | -23.9 |
| **Largest off-site transfers** | | **1 636.6** | **11 865.8** | **2 441.2** | **8 128.7** | **13 656.6** | **37 729.1** | **37 405.7** | **323.3** | **0.9** |
| **National total** | | **1 819.1** | **12 187.0** | **2 443.8** | **9 443.9** | **13 955.5** | **39 849.3** | **40 268.3** | **-419.0** | **-1.0** |
| **% of national total** | | **90.0** | **97.4** | **99.9** | **86.1** | **97.9** | **94.7** | **92.9** | **1.8** | **1.9** |

## Table 3-3 Industrial Sectors Reporting Largest Off-site Transfers for Treatment Prior to Final Disposal in 2001

| CAS No. | Pollutant | Off-site Transfers for Treatment Prior to Final Disposal (tonnes) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Physical | Chemical | Biological | Incineration | MSTP | 2001 Total | 2000 Total | Change (2000–2001) | % change (2000–2001) |
| **1. NAICS No. 3251 – Basic Chemical Manufacturing:** | | | | | | | | | | |
| NA | Nitrate ion in solution at pH ≥6.0 | 0.0 | 0.0 | 0.0 | 39.0 | 3 772.0 | 3 811.0 | 3 954.0 | -143.0 | -3.6 |
| 67-56-1 | Methanol | 0.0 | 3.0 | 0.0 | 22.3 | 1 170.1 | 1 195.4 | 1 041.8 | 153.6 | 14.7 |
| 7664-93-9 | Sulphuric acid | 0.0 | 336.0 | 0.0 | 134.8 | 11.4 | 482.2 | 491.9 | -9.7 | -2.0 |
| 67-63-0 | Isopropyl alcohol | 0.4 | 2.0 | 7.6 | 217.0 | 9.0 | 236.0 | 165.8 | 70.2 | 42.4 |
| 7697-37-2 | Nitric acid | 0.0 | 0.2 | 0.0 | 125.8 | 0.0 | 126.0 | 139.8 | -13.8 | -9.9 |
| **Total all substances in sector** | | **2.2** | **430.1** | **26.4** | **954.8** | **5 192.3** | **6 605.8** | **7 386.5** | **-780.7** | **-10.6** |
| **2. NAICS No. 4881 – Support Activities for Air Transportation:** | | | | | | | | | | |
| 107-21-1 | Ethylene glycol | 0.0 | 0.0 | 1 781.8 | 0.0 | 1 976.2 | 3 758.0 | 2 232.6 | 1 525.4 | 68.3 |
| NA | Mercury (and its compounds) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | – |
| **Total all substances in sector** | | **0.0** | **0.0** | **1 781.8** | **0.0** | **1 976.2** | **3 758.0** | **2 232.6** | **1 525.4** | **68.3** |
| **3. NAICS No. 3311 – Iron and Steel Mills and Ferro-Alloy Manufacturing:** | | | | | | | | | | |
| NA | Zinc (and its compounds) | 66.3 | 1 846.8 | 0.0 | 0.0 | 0.6 | 1 913.6 | 1 384.0 | 529.7 | 38.3 |
| NA | Manganese (and its compounds) | 103.2 | 328.3 | 0.0 | 0.0 | 0.1 | 431.6 | 527.9 | -96.3 | -18.2 |
| NA | Chromium (and its compounds) | 178.7 | 24.7 | 0.0 | 0.2 | 1.6 | 205.1 | 484.8 | -279.7 | -57.7 |
| 7789-75-5 | Calcium fluoride | 190.2 | 0.0 | 0.0 | 0.0 | 0.0 | 190.2 | 599.0 | -408.8 | -68.2 |
| NA | Lead (and its compounds) | 0.0 | 133.4 | 0.0 | 0.0 | 0.1 | 133.5 | 219.1 | -85.6 | -39.1 |
| **Total all substances in sector** | | **682.2** | **2 477.7** | **0.0** | **0.6** | **189.6** | **3 350.0** | **3 868.2** | **-518.1** | **-13.4** |
| **4. NAICS No. 3329 – Other Fabricated Metal Product Manufacturing:** | | | | | | | | | | |
| 7647-01-0 | Hydrochloric acid | 0.0 | 1 966.6 | 0.0 | 0.0 | 114.5 | 2 081.0 | 1 416.2 | 664.9 | 46.9 |
| 7697-37-2 | Nitric acid | 0.0 | 682.7 | 0.0 | 0.0 | 0.0 | 682.7 | 720.1 | -37.4 | -5.2 |
| 7664-93-9 | Sulphuric acid | 0.0 | 102.8 | 0.0 | 0.0 | 49.5 | 152.3 | 1 209.1 | -1 056.8 | -87.4 |
| NA | Nickel (and its compounds) | 0.0 | 137.2 | 0.0 | 0.0 | 1.0 | 138.2 | 54.7 | 83.5 | 152.6 |
| NA | Copper (and its compounds) | 0.0 | 54.8 | 0.0 | 0.0 | 0.4 | 55.1 | 19.8 | 35.3 | 177.8 |
| **Total all substances in sector** | | **8.1** | **3 014.7** | **0.0** | **5.5** | **165.9** | **3 194.2** | **3 529.3** | **-335.1** | **-9.5** |
| **5. NAICS No. 2329 – Other Special Trade Contracting:** | | | | | | | | | | |
| 7647-01-0 | Hydrochloric acid | 198.0 | 1 554.7 | 0.0 | 0.0 | 0.0 | 1 752.7 | 968.0 | 784.8 | 81.1 |
| 7664-93-9 | Sulphuric acid | 0.0 | 1 283.1 | 0.0 | 0.0 | 0.0 | 1 283.1 | 2 359.7 | -1 076.6 | -45.6 |
| 100-41-4 | Ethylbenzene | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | – |
| 108-88-3 | Toluene | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | – |
| 1330-20-7 | Xylene (mixed isomers) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | – |
| **Total all substances in sector** | | **198.0** | **2 837.8** | **0.0** | **0.0** | **0.0** | **3 035.8** | **3 327.7** | **-291.8** | **-8.8** |

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## 4.1 Government References


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Environment Canada. *Notice with Respect to Substances in the National Pollutant Release Inventory for 2000*. Extract, *Canada Gazette*, Part I, December 25, 1999.

Environment Canada. *Notice with Respect to Substances in the National Pollutant Release Inventory for 2000 — Amendment*. Extract, *Canada Gazette*, Part I , December 23, 2000.

Environment Canada. *Supplementary Guide for Reporting to the National Pollutant Release Inventory — Alternate Thresholds — 2000*. Minister of Public Works and Government Services Canada, Ottawa, 2000.

Government of Canada. *Canadian Environmental Protection Act, 1999*. Statutes of Canada 1999. Chapter 33. Act assented to 14 September 1999.

Statistics Canada. *North American Industry Classification System (NAICS) Canada Manual — 1997*. Catalogue 12-501-XPE, Ottawa, 1998.

Statistics Canada. *Standard Industrial Classification — 1980*. Catalogue 12-501E, Standards Division, Ottawa, 1989.


## 4.2 Web Site References for Substance Information

### *A. Environment Canada*

- The Green Lane: **www.ec.gc.ca/envhome.html**
- National Pollutant Release Inventory On-line Data Search: **www.ec.gc.ca/npri/**
- CEPA Environmental Registry: **www.ec.gc.ca/CEPARegistry/**
- New and Existing Substances: **www.ec.gc.ca/substances/**
- List of Toxic Substances (Schedule 1 of CEPA 1999): **www.ec.gc.ca/CEPARegistry/subs_list/Toxicupdate.cfm**

### *B. Health Canada*

- Existing Substances Division: **www.hc-sc.gc.ca/hecs-sesc/exsd/index.htm**

### *C. International Links*

- Agency for Toxic Substances and Disease Registry (ATSDR): **www.atsdr.cdc.gov/**
- Chemfinder: **chemfinder.cambridgesoft.com/**
- Environmental Defense Scorecard: **www.scorecard.org/**
- International Agency for Research on Cancer (IARC): **www.iarc.fr/**
- International Programme on Chemical Safety (IPCS): **www.inchem.org/**
- National Toxicology Program (NTP): **ntp-server.niehs.nih.gov/**
- Organisation for Economic Co-operation and Development (OECD): **www.oecd.org/home/**
- United Nations Environment Programme (UNEP): **www.unep.org/**
- World Health Organization: **www.who.int/dsa/cat97/zehc2.html**

## 4.3 Additional Sources of Information

*Agency for Toxic Substances and Disease Registry (ATSDR)*
1600 Clifton Road (E29)
Atlanta, GA 30333
U.S.A.
Tel.: (404) 639-6300
Fax: (404) 639-6315
Web site: **www.atsdr.cdc.gov/**

*Canadian Centre for Occupational Health and Safety*
Chemical Evaluation Search and Retrieval System (CESARS)
250 Main Street East
Hamilton, ON
L8N 1H6
Tel.: (905) 570-8094
Fax: (905) 572-2206
Web site:
**www.ccohs.ca/products/databases/cesars.html**

*Commission for Environmental Cooperation (CEC)*
393 St. Jacques Street West
Suite 200
Montréal, QC
H2Y 1N9
Tel.: (514) 350-4300
Fax: (514) 350-4314
Web site: **www.cec.org**

*Health Canada*
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# APPENDIX A — RELEASES AND TRANSFERS DEFINED BY NPRI

### On-site Releases:

An on-site release is a discharge of an NPRI-listed pollutant to the environment, within the physical boundaries of the facility. This includes:

- emissions to air — discharges through a stack, vent, or other point release, losses from storage and handling of materials, fugitive emissions, spills and accidental releases, and other non-point releases;
- releases to surface waters — discharges, spills, and leaks, but not including discharges to municipal wastewater treatment plants (which are reported under off-site transfers for treatment); and
- releases to land — spills, leaks, and other.

### Final Disposal Activities — On Site and Off Site:

The following activities or operations are included in the category classified as "final disposal" — on site and off site:

- containment — two forms of containment are identified:

  i) landfill; and

  ii) other storage;
- underground injection;
- land treatment — for the purpose of land application or land farming; and
- off-site final disposal for storage.

### Off-site Transfers for Treatment Prior to Final Disposal:

A shipment of an NPRI-listed substance may be transferred to an off-site location for treatment prior to final disposal. The treatment processes include:

- physical treatment (e.g., drying, evaporation, encapsulation, or vitrification);
- chemical treatment (e.g., precipitation, stabilization, or neutralization);
- biological treatment (e.g., bio-oxidation);
- incineration or thermal treatment where energy is not recovered; and
- treatment at a municipal sewage treatment plant.

### Off-site Transfers for Recycling and Energy Recovery:

A shipment of an NPRI-listed substance may be transferred to an off-site location for recycling and energy recovery. "Recycling" refers to activities that keep a material or a component of the material from becoming a waste destined for final disposal. Nine types of recycling operations are identified:

- recovery of solvents;
- recovery of organic substances (other than solvents);
- recovery of metals and metal compounds;
- recovery of inorganic materials (other than metals);
- recovery of acids and bases;
- recovery of catalysts;
- recovery of pollution abatement residues;
- refining or reuse of used oil; and
- other recovery, reuse, or recycling activities.

An NPRI substance may be sent for energy recovery when the substance or the material containing it has sufficient energy content (BTU value) to allow its use as an alternative to fossil fuels or other forms of energy.

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# National Pollutant Release Inventory

*Canadian Environmental Protection Act, 1999*